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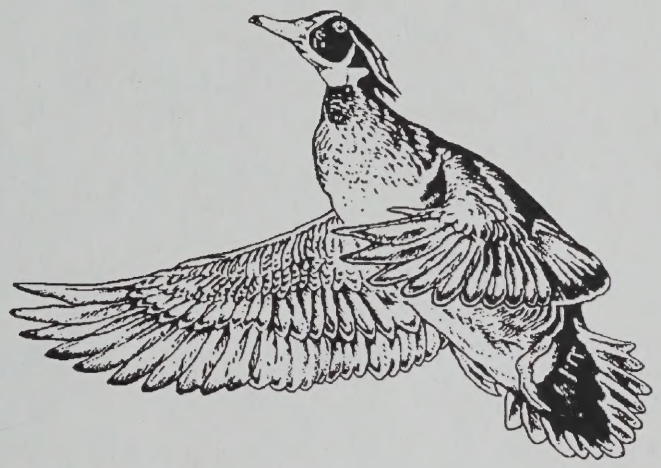

Wood Duck Investigations

W-118-R-2

1 July 1993 through 30 June 1994

Annual Federal Aid Performance Report

by

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SEGMENT PERFORMANCE REPORT - FY 1994
Wood Duck Investigations
Federal Aid in Wildlife Restoration
W-118-R-2

STUDY I THE IMPORTANCE OF NATURAL TREE CAVITIES FOR NESTING BY WOOD DUCKS IN ILLINOIS

This report presents activities undertaken during segment 2 of the project. Activities included the completion of a potential wood duck (*Aix sponsa*) nest cavity (potential cavity) survey in bottomland timber at Sanganois Conservation Area (CA). Tree cavities deemed potentially suitable for wood duck nesting were inspected to determine their status as suitable wood duck nest cavities (suitable cavity). Data will be collected during summer 1994 on natural cavity use by wood ducks. These data will be presented in the final project report. Aerial surveys over bottomland timber were repeated this spring for an estimate of breeding wood duck population densities at Sanganois CA.

STUDY AREA

Nest Cavity Search

The study area encompassed portions of southwest Mason, northwest Cass, and east Schuyler counties (Fig. 1) and included 3,835 ha (9,476 acres) of the state owned Sanganois CA (Fig. 2). Sanganois CA lies at the confluence of the Illinois and Sangamon rivers and is one of the few state owned refuges and public hunting areas along the Illinois River. The parcel of bottomland known as Topper's Hole in the southwest corner of Sanganois CA was excluded from sampling because of lack of accessibility.

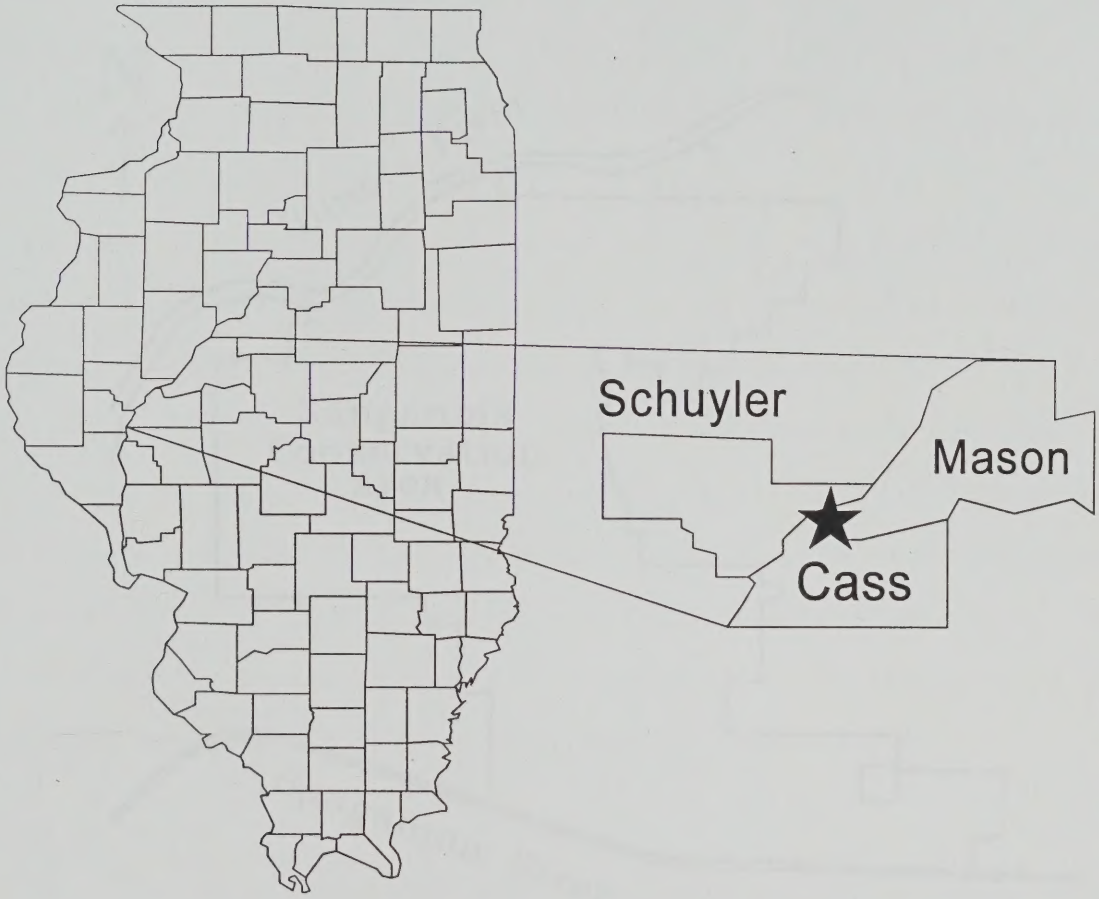

Figure 1. Wood duck study area in Mason, Cass, and Schuyler counties in west-central Illinois.

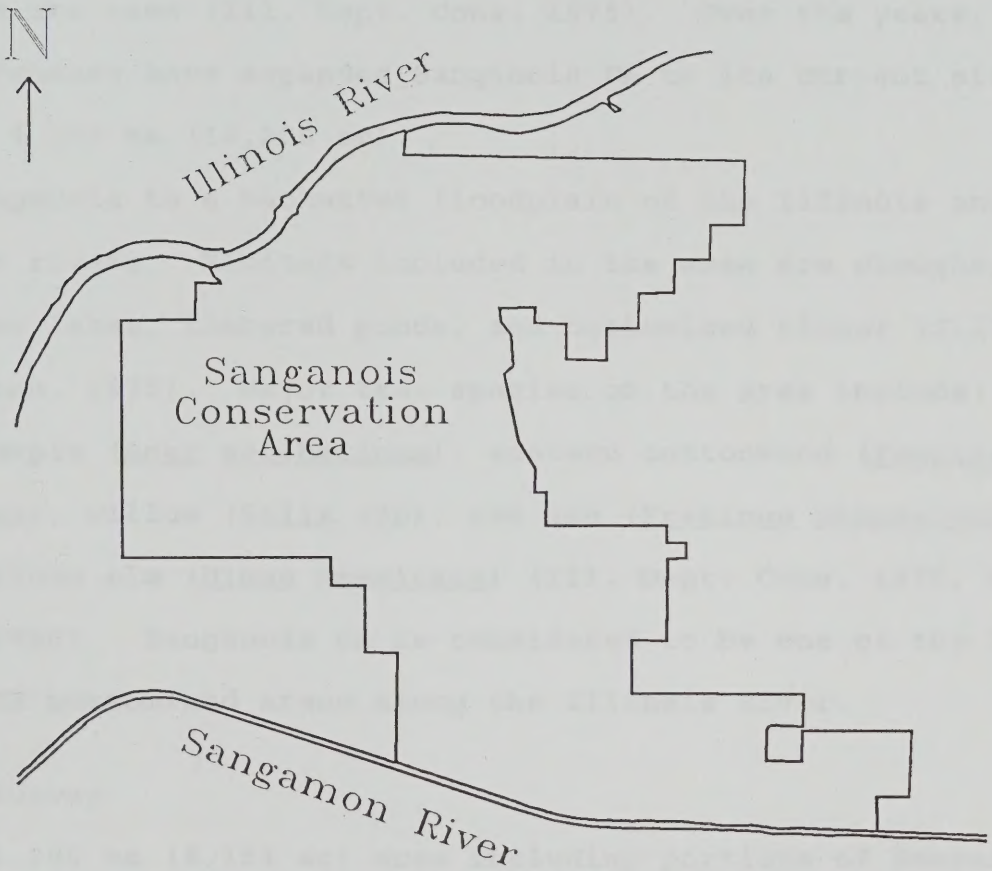

Figure 2. Natural cavity study area at the Sanganois Conservation Area.

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Sanganois CA was created in 1948 when the state of Illinois purchased several private duck clubs in the area. The largest of these clubs was the Sanganois Gun Club from which the refuge received its name (Ill. Dept. Cons. 1975). Over the years, other land purchases have expanded Sanganois CA to its current size of approx. 4,168 ha (10,300 ac).

Sanganois is a backwater floodplain of the Illinois and Sangamon rivers. Habitats included in the area are sloughs, backwater lakes, timbered ponds, and bottomland timber (Ill. Dept. Cons. 1975). Major tree species on the area include: silver maple (Acer saccharinum), eastern cottonwood (Populus deltoides), willow (Salix spp), red ash (Fraxinus pennsylvanica), and American elm (Ulmus americana) (Ill. Dept. Cons. 1975, Havera et al. 1980). Sanganois CA is considered to be one of the least disturbed bottomland areas along the Illinois River.

Aerial Survey

A 3,300 ha (8,154 ac) area including portions of Sanganois CA and various other private lands were surveyed by air to estimate wood duck breeding pair densities in this bottomland area. Study area boundaries were marked on the north and south by the Illinois and Sangamon rivers, respectively. East and west boundaries were defined by longitude lines 90° 18′ 39″ and 90° 21′ 57″, respectively. Habitat conditions for this area were similar to the primary study area searched for natural cavities.

JOB I-1 Abundance of Natural Tree Cavities in a Bottomland Forest

INTRODUCTION

Nest Cavity Search

Due to extensive flooding by the Illinois and Sangamon rivers and leaf production (leafout) by trees in spring 1993, plot searches for potential cavities were prohibited until fall 1993. Potential cavity plot searches resumed 10 November 1993 and were completed 22 December 1993.

Aerial Survey

Aerial surveys over bottomland timber were conducted during spring 1994 to estimate wood duck breeding pair densities at Sanganois CA. To obtain the optimum aerial survey window for breeding wood ducks, aerial surveys were flown on 28 March 1994 (first survey), 8 April 1994 (second survey), and 19 April 1994 (third survey). The chronology and number of surveys differed from the 1993 surveys in order to refine spring wood duck migration and leafout by bottomland timber.

MATERIALS AND METHODS

Habitat

Wetland and upland habitats on the study area were classified using National Wetlands Inventory (NWI) data stored on the Illinois Geographic Information System (IGIS) in Champaign, IL. NWI data were obtained from aerial photographs dated spring 1986.

Wood duck nesting habitat was defined as any palustrine forested wetland (Cowardin et al. 1979) designated by NWI within the Sanganois CA. Forested/scrub-shrub, forested/emergent, scrub-shrub, and scrub-shrub/emergent wetland habitats were excluded from sampling because the dominant tree species occurring in these habitats were willows. Willows, especially in the scrub-shrub growth stage, were not considered to be good producers of nesting cavities suitable for use by wood ducks.

Nest Cavity Search

A total of 109 sample points was randomly selected for tree cavity investigations (Fig. 3). One hundred sample points were desired for an adequate sample size, and 9 points were additionally selected as alternate sites. Originally, study area boundaries were drawn on NWI maps and placed on a digitizer. Latilong coordinates were randomly selected with a calculator and located on the NWI maps using Measugraph 2.1 Software. Latilong coordinates of study area boundaries produced by the digitizer were incorporated into the IGIS for habitat evaluation. Only those coordinates selected within desired habitats (palustrine forested wetland) were utilized.

Sample points were located in bottomland timber with the aid of a Magellan NAV 1000 PRO Global Positioning System (GPS). All terrain vehicles (ATV) and a jon boat were used for transportation.

Circular plots (0.5 ha, 1.24 ac) centered on each sample point were marked using orange paint. All trees existing within 0.5 ha plots were searched by $\geq$ 1 observer with the aid of

Figure 3. Sample plots for selected investigation of natural cavities at the Sanganois Conservation Area, 1993-1994.

binoculars. All trees containing potential cavities were marked with tree marking paint and a numbered aluminum tag. Variables enabling observers to relocate potential cavities for subsequent inspection were recorded (Table 1). Tree height and cavity height were measured using a clinometer and tree diameter at breast height (dbh) was measured using a forester's dbh tape.

Cavities were considered to be potentially suitable if they had entrance dimensions that appeared to be 6.5 x 9.0 cm (2.5 X 3.5 in) (Grice and Rogers 1965), platform dimensions at least 12.5 x 17.5 cm (5 X 7 in), and not more than 500 cm (197 in) in depth (Bellrose et al. 1964). Cavities were also classified as unsuitable if they held water, contained excessive debris, were not deep enough to conceal the incubating hen (Robb 1986), or were hollow to the ground (F.C. Bellrose, Ill. Nat. Hist. Surv., pers. commun.).

Aerial Survey

Aerial surveys over bottomland timber were designed to estimate densities of the wood duck breeding population. Timing of aerial surveys corresponded with the nesting behavior of wood ducks in Illinois and were initiated after peak spring migration of wood ducks in central Illinois but before leafout (Bellrose 1980, Heitmeyer and Fredrickson 1990, Yetter 1992). Surveys were flown with a Bell Long Ranger helicopter with 1 pilot and 2 observers. Helicopters and pilots were rented from Division of Aeronautics, Illinois Dept. of Transportation, Springfield, Illinois. Helicopters flew at an altitude of 45 m (150 ft) above ground level (AGL) at a ground speed of 35-50 knots (40-58 mph)

Table 1. Tree and cavity variables recorded from potential wood duck nest cavities at Sanganois Conservation Area during fall 1993 in west-central Illinois.

Variable	Description
Tree	
SPECIE	Species of cavity tree
STATUS	Condition of cavity tree (live or dead)
DBH	Diameter of cavity tree at breast height
THEIGHT	Total height of cavity tree
NUMCAV	Total number of cavities on a tree
Cavity	
TYPE	Type of cavity (normal, bucket, or both)
FORM	Origin of cavity (woodpecker, broken branch, etc.)
ORIENT	Orientation of cavity (compass bearing)
EHEIGHT	Height of lowest cavity entrance
LOCATION	Stem type of cavity location (branch or trunk)

(Sherman 1990, R.M. Kaminski, Mississippi State Univ., pers. commun.).

Seventeen north-south transects were mapped over the 3,300 ha (8,154 ac) area equally spaced every 12" of longitude (285 m, 936 ft) (Fig. 4). Observers recorded all waterfowl detected within 45 m (150 ft) of either side of the helicopter. Observers recorded all waterfowl species detected as pairs, mixed sex flocks, single sex flocks, single sex, unknown sex, or unknown species. Surveys were conducted between 0900 and 1130 hours on clear days to reduce visibility biases.

Total number of wood duck indicated breeding pairs (IBPs) per transect were determined by summing the number of segregated pairs, lone males, males in bachelor groups $\leq$ 4, and lone females (Hammond 1969, Stewart and Kantrud 1972, U.S. Fish Wildl. Serv. and Can. Wildl. Serv. 1987, Yetter 1992). As a result of the number of wood ducks of unknown sex recorded during surveys, 43.2 percent (percentage of female wood ducks in the population (Bellrose 1980)) of the unknown sex wood ducks were considered females and enumerated as IBPs.

Data Analysis

All data were computerized using Lotus 1-2-3 software Release 3.4 (Lotus Development Corp. 1990). The mean number of wood duck IBPs/ha of transect observed during aerial surveys was determined using the MEANS procedure of the Statistical Analysis System (SAS) (SAS Inst. Inc. 1988). The CORR procedure of SAS was used to identify a buildup of wood ducks on aerial transects as surveys progressed. Differences between wood duck IBP

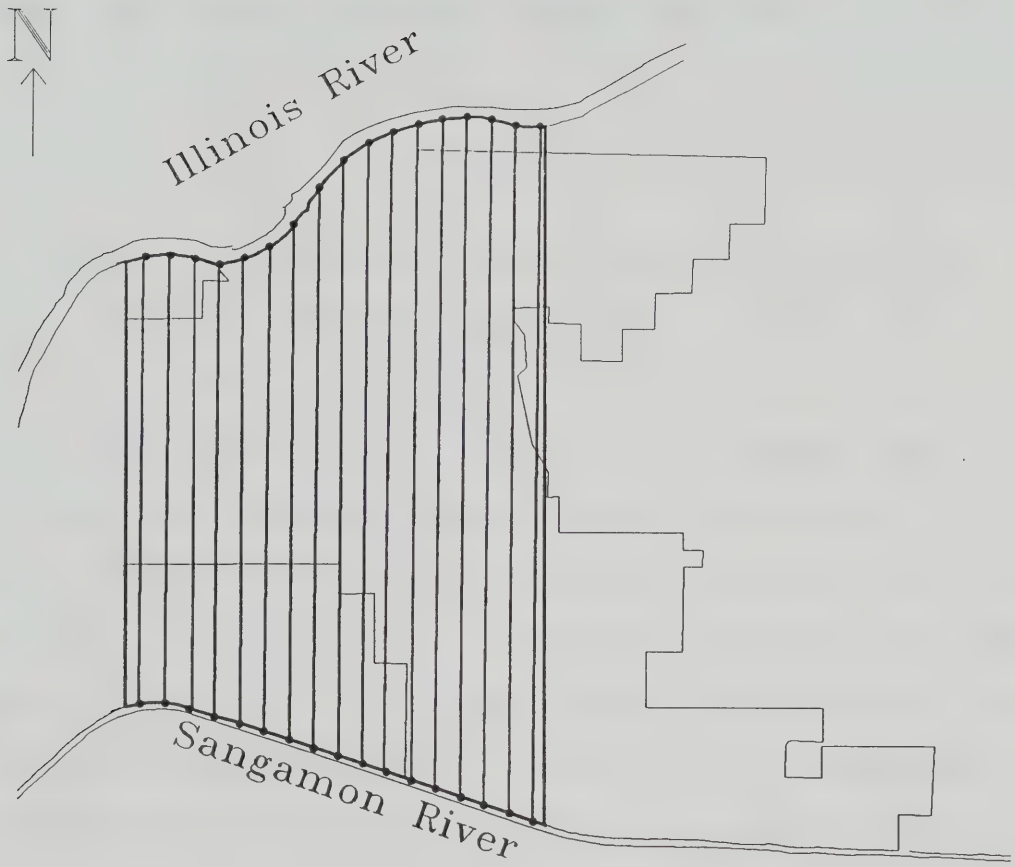

Figure 4. Aerial study area and transect lines including portions of Sanganois Conservation Area and adjacent private lands flown by helicopter to estimate the breeding population of wood ducks during springs 1993 and 1994.

densities observed during the second aerial survey (22 April) of 1993 and third aerial survey (19 April) of 1994 were tested using a two sample t-test (Hinkle et al. 1988:238-259). All statistical tests were considered significant when $P \leq 0.05$.

RESULTS

Habitat

A total of 41 NWI habitat codes (Cowardin et al. 1979) were observed on the study area totaling 3,835 ha (9,476 ac) (Table 2). Palustrine forested habitats were the dominant habitat type totaling 2,159 ha (5,334 ac). Forested habitats were followed in decreasing area by lacustrine habitat - 665 ha (1,643 ac), upland habitat - 470 ha (1,162 ac), palustrine scrub-shrub habitat - 270 ha (666 ac), palustrine emergent and aquatic bed habitats - 135 ha (335 ac), palustrine forested/scrub shrub and forested/emergent habitats - 100 ha (248 ac), palustrine unconsolidated bottom habitat - 35 ha (87 ac), and riverine habitat - 0.34 ha (0.84 ac). Most of the NWI habitat classified as upland was actually cleared bottomland forest currently in agriculture.

Nest Cavity Search

The remaining 50 of the total 109 sample plots were examined during fall 1994. We located 326 potential cavities in 109 sample plots. Seventy-seven of the 109 plots contained ≥ 1 potential cavity, and 20 plots had no potential cavities. Twelve plots were located in habitats other than palustrine forested wetland and were abandoned.

Table 2. Coverage of National Wetlands Inventory (NWI) habitat classifications within the Sanganois study area, spring 1994.

Habitat code[a]	Habitat area	
	hectares	acres
L1UBHh	540.1	1,334.4
L1UBHhx	1.8	4.4
L2ABG	1.2	3.0
L2ABGh	50.5	124.7
L2UBGh	71.1	175.6
L2UBGhx	0.5	1.2
PABGH	1.8	4.4
PEM/FO1Fh	4.6	11.3
PEM/SS1A	7.2	17.9
PEM/SS1Ah	0.9	2.2
PEM/SS1Fh	61.2	151.2
PEMAh	2.3	5.6
PEMC	0.1	0.1
PEMCh	13.4	33.0
PEMCx	1.6	4.1
PEMF	0.7	1.8
PEMFh	41.6	102.9
PEMFx	0.1	0.3
PFO/SS1Ch	5.2	12.9
PSS/FO1Fh	84.0	207.4
PFO1/EMFh	11.2	27.7
PFO1A	482.2	1,191.5
PFO1Ah	290.7	718.3
PFO1C	78.9	195.0
PFO1Ch	777.4	1,920.9
PFO1Fh	529.5	1,308.3
PSS/FO1Ah	2.4	5.8
PSS/FO1Fh	37.8	93.4
PSS1/EMFh	66.8	165.2
PSS1A	4.6	11.4
PSS1Ah	11.0	27.2
PSS1C	0.1	0.1
PSS1Ch	61.9	152.8
PSS1Fh	85.2	210.4
PUBF	0.6	1.4
PUBFh	5.1	12.6
PUBG	0.3	0.8
PUBGh	29.2	72.1
PUBGx	0.3	0.6
R2UBHx	0.3	0.8
Upland	470.1	1,161.5
Total area	3,834.5	9,476.2

[a] Defined by Cowardin et al. (1979).

Aerial Survey

The mean wood duck density observed during the first aerial survey of 1994 was 0.454 IBPs/ha of transect (0.184 IBPs/ac) (SE = 0.049, $CI_{95} \pm 0.106$), yielding a population estimate of 1,493 wood duck IBPs for the 3,300 ha study area. However, observers noted this survey may have been too early in the chronology of wood duck migration. Observers may have recorded migrant as well as resident wood ducks.

The second aerial survey of 1994 was cut short due to priorities of helicopter use; however, four transects were completed. Based on this limited transect coverage, the mean wood duck IBP density was 0.241 IBPs/ha of transect (0.098 IBPs/ac) (SE = 0.026, $CI_{95} \pm 0.083$). This density indicates a population estimate of 796 wood duck IBPs on the 3,300 ha study area. The limited sample size of this survey prevents further consideration of data; however, observers noted this survey was the best with respect to migrant species observed and lack of tree leafout. Due to the subsequent high water levels of the Sangamon River, this flight could not be rescheduled.

The third aerial survey of 1994 produced 0.124 IBPs/ha (0.050 IBPs/ha) of transect (SE = 0.306, $CI_{95} \pm 0.033$) which translates to an estimated 411 wood duck IBPs for the 3,300 ha study area. This survey may have been somewhat late with respect to the chronology of leafout; however, the mean density observed during the third survey of 1994 (19 April) did not differ ($\underline{P}$ = 0.05) from the mean density observed during the second survey (22 April) of 1993 (mean = 0.110 IBPs/ha (0.045 IBPs/ac) of transect, SE = 0.014, $CI_{95} \pm 0.030$).

No significant correlation was detected between the number of wood ducks observed/ha of transect and the transect number. This finding negates the hypothesis of a build up of wood ducks as aerial surveys progressed. Wood ducks flushed from transect lines by the helicopter likely left the area entirely or returned to the approximate area from where they flushed.

JOB I-2 Abundance of Natural Tree Cavities Suitable for Nesting by Wood Ducks and Nesting Success of Wood Ducks in Cavities.

All tree cavities deemed potentially suitable as wood duck nest sites were inspected to determine their suitability status. Cavity inspection was initiated 26 August 1993 and was completed 23 May 1994. Those cavities meeting suitability criteria were inspected after 1 July 1994 to determine wood duck use and nest success.

MATERIALS AND METHODS

Study plots and potential cavity trees were relocated with a GPS and by the presence of tree marking paint placed on cavity trees during winters of 1992 and 1993. Potential cavities were examined for suitability using a modified version of the single rope, rope-walking system (Montgomery 1982, Meredith and Martinez 1986, Warild 1990, Padgett and Smith 1992) and with climbing spikes, a safety belt, and lanyard (Robb 1986). Instruction and demonstration of climbing techniques were provided by H.H. Hobbs III, Professor of Biology, Wittenberg University, Springfield, Ohio, in April of 1993.

Various methods of placing a climbing rope over a cavity tree branch were examined. The best method investigated was a compound bow and arrow equipped for bow fishing. After shooting a fish arrow over a desired branch, a climbing rope could be pulled over and anchored.

A number of variables were recorded at each suitable cavity (Table 3). An instrument for natural tree cavity inspection was designed and constructed of two 15.2 cm (6 in) sections of 5.1 cm (2 in) PVC pipe and a right angle PVC coupler. A mirror was attached inside the right angle coupler, and a small flashlight was attached to one end of the device. With this instrument, researchers could inspect the interiors of cavities for internal dimensions and evidence of usage. Cavity entrance and internal dimensions were measured with a metal measuring tape. Diameter of the tree bole at entrance height and dbh of the cavity tree were measured with a forester's dbh tape, and height of entrance above ground was measured with a 200 ft measuring tape. Entrance heights were rounded to the nearest 15 cm (0.5 ft).

Cavities were considered suitable for nesting by wood ducks if they had entrance dimensions $\geq$ 6.5 x 9.0 cm (2.5 x 3.5 in) (Grice and Rogers 1965), platform dimensions $\geq$ 12.5 x 17.5 cm (5 x 7 in), and not more than 500 cm (197 in) in depth (Bellrose et al. 1964). Cavities were also classified as unsuitable if they held water, contained excessive debris, were not deep enough to conceal the incubating hen (Robb 1986), or were hollow to the ground (F.C. Bellrose, Ill. Nat. Hist. Surv., pers. commun.).

All data were computerized using Lotus 1-2-3 software Release 3.4 (Lotus Development Corp. 1990).

Table 3. Variables used to determine the suitability of natural tree cavities for nesting wood ducks as well as descriptive variables for suitable natural cavities, natural cavity trees, and natural cavity sites at Sanganois Conservation Area in 1993-1994.

Variable	Variable Description
Cavity	
ORIENT	Cavity orientation (compass bearing)
EHEIGHT	Height of entrance above ground
WIDTH	Horizontal width of lowest suitable cavity entrance
LENGTH	Vertical length of lowest suitable cavity entrance
DEPTH	Distance from bottom of lowest suitable cavity entrance to the platform
HAE	Distance from top of lowest suitable cavity entrance to top of cavity
CWE	Horizontal width of the cavity at lowest entrance height
CLE	Horizontal length of the cavity at lowest entrance height
PLATW	Horizontal width of the cavity platform
PLATL	Horizontal length of the cavity platform
USE	Evidence of cavity use by a vertebrate
FORM	Origin of cavity (woodpecker, broken branch, etc.)
LOCATE	Stem type of cavity location (e.g., trunk or branch)
TYPE	Type of cavity (e.g., normal, bucket, or both)
DBE	Diameter of bole at entrance
NUM	Number of suitable entrances

Table 3. Continued.

Variable	Variable Description
<u>Tree</u>	
THEIGHT	Total height of tree
SPECIE	Tree species or taxa
STATUS	Tree status (e.g., live or dead)
DBH	Diameter of tree at breast height
QUARTER	Location of cavity tree in 0.5 ha circular plot
<u>Site</u>	
BASALS	Tree stand basal area at the cavity site
BASALV	Tree basal area in the immediate vicinity of the cavity tree
DENSITYV	Tree density in the immediate vicinity of the cavity tree

RESULTS

Natural Cavities

Of the 326 potential cavities marked, 181 cavities (55.5%) did not meet suitability criteria (Table 4). Eighty-three of the 326 (25.5%) potential cavities satisfied suitability criteria and were monitored for wood duck use. Fifty-four (16.6%) potential cavities were located in trees that were not stable enough to climb, and 8 (2.5%) potential cavities were lost due to branch or tree fall. Eight additional cavities were located in sample plots during cavity inspection. These cavities were either overlooked or newly created since the initial plot inspections. Six of these newly found cavities were suitable, and 2 were not climbable. Therefore, 89 suitable cavities were inspected and 56 potential cavities were not climbable in the 97 plots.

In order to determine the number of suitable cavities in nonclimbable trees, we assumed the ratio of suitable cavities to marked potential cavities was equal between inspected and noninspected cavities. Of the 326 potential cavities marked, 264 (81.0%) were inspected. Eighty-three of these 264 (31.4%) inspected cavities were classified as suitable wood duck nest sites. Therefore, 18 (31.4%) of the 56 potential cavities located in nonclimbable trees were considered as suitable wood duck nest sites. All together 107 suitable cavities were found in the 97 sample plots at Sanganois Ca yielding a suitable cavity density of 2.21 cavities/ha (0.89 cavities/ac; SE = 0.25, $CI_{95} \pm 0.5$). In the 2,159 ha (5,335 ac) of forested wetland habitat at

Table 4. Suitability status of potential wood duck nest cavities at Sanganois Conservation Area, 1993-1994.

Status	Sample size	Percent
Potential cavities		
Not suitable	181	55.5
Suitable	83	25.5
Not climable	54	16.6
Stem fall	8	2.5
Total	326	100.0
Additional cavities		
Suitable	6	75.0
Not climable	2	25.0
Total	8	100.0

Sanganois CA, there were an estimated 4,771 natural cavities suitable for nesting wood ducks.

Suitable wood duck cavities were defined as normal side entrance cavities, bucket cavities, or both. Normal cavities accounted for 63 of the 89 (70.8%) (Table 5). Twenty-five of the 89 cavities (28.1%) were classified as buckets or top entrance cavities, and 1 cavity (1.1%) had both a top and side entrance.

The composition of tree species with suitable cavities was 75.3 percent silver maple (n = 67), 9.0 percent red ash (n = 8), 7.9 percent willow (n = 7), 5.6 percent eastern cottonwood (n = 5), and 2.2 percent American sycamore (*Platanus occidentalis*) (n = 2) (Table 5). Twelve of the suitable cavities were located in dead trees and 77 in living trees. Pileated woodpeckers (*Dryocopus pileatus*) excavated 13 of the 89 (14.6%) cavities and 75 (84.3%) were formed naturally. One cavity had both a woodpecker and natural entrance. Eighteen (20.2%) suitable cavities were located in tree branches and 71 (79.8%) were located in trunks.

Because of safety precautions, 2 of the 89 suitable cavities were not inspected for measurements or evidence of usage. Mammalian hair or feces were found in 42 of the 87 cavities (48.3%) (Table 5). Avian use was detected in 11 (12.6%) of the cavities. No evidence of use was detected in 34 (39.1%) cavities. Characteristics of suitable cavities and suitable cavity trees were pooled across tree status (live or dead) and cavity type (normal, bucket, and both) (Table 6). Sample sizes varied due to limitations experienced while afield.

Table 5. Qualitiative characteristics of suitable wood duck nest cavities at Sanganois Conservation Area, 1993-1994.

Variable	Suitable cavity	
	Sample size	Percent
Cavity type		
Normal	63	70.8
Bucket	25	28.1
Both	1	1.1
Tree species		
Silver maple (*Acer saccharinum*)	67	75.3
Red ash (*Fraxinus pennsylvanica*)	8	9.0
Willow (*Salix* spp.)	7	7.9
Eastern cottonwood (*Populus deltoides*)	5	5.6
American sycamore (*Platanus occidentalis*)	2	2.2
Tree status		
Alive	77	86.5
Dead	12	13.5
Cavity formation		
Natural	75	84.3
Woodpecker	13	14.6
Both	1	1.1
Stem type		
Trunk	71	79.8
Branch	18	20.2
Evidence of use		
Mammalian	42	48.3
Avian	11	12.6
No use	34	39.1

Table 6. Characteristics of cavities suitable for nesting by wood ducks at Sanganois Conservation Area in west-central Illinois, 1993-1994.

Characteristic[a]	Sample size	Mean	S.D.	Range
Cavity				
DBE[b]	87	50.9	16.7	27.7-108.7
EHEIGHT[c]	81	7.07	4.2	0.6-15.7
WIDTH[b]	87	16.4	8.7	7.6-48.3
LENGTH[b]	87	35.7	28.5	7.6-127.0
DEPTH[b]	86	76.4	91.4	6.4-477.5
HAE[b]	82	32.8	45.0	0.0-193.0
CWE[b]	87	27.2	14.9	12.7-114.3
CLE[b]	87	26.6	13.3	12.7-96.5
PLATW[b]	80	26.5	12.7	12.7-66.0
PLATL[b]	80	27.5	13.2	12.7-78.7
Tree				
THEIGHT[c]	86	20.4	7.0	1.5-33.5
DBH[b]	87	63.6	20.8	27.4-118.1

[a] Refer to Table 3 for variable definitions.
[b] In centimeters.
[c] In meters.

DISCUSSION

Suitable cavity densities of 2.21 cavities/ha of bottomland forest at Sanganois CA were relatively high when compared with other areas. Only three previous surveys found higher densities of cavities (Bellrose and Holm 1994). Haramis (1975) found 3.95 suitable cavities/ha in New York. Gilmer et al. (1978) reported 4.2 suitable cavities/ha in Minnesota, and 5.50 suitable cavities/ha were found in New Brunswick (Prince 1968). However, all three of these studies examined smaller forested areas (6.58-8.36 ha), whereas the present study sampled 48.5 ha of bottomland forest.

Suitable cavity densities at Sanganois CA were greater than but more comparable with densities found in Indiana (1.23 cavities/ha, Robb 1986) and Missouri (1.19 cavities/ha, Hartowicz 1965). Suitable cavity densities in other geographic regions ranged from 0.075 to 0.67 cavities/ha (Bellrose and Holm 1994:170-171). A preliminary survey in 1944 of 147 ha of bottomland forest in central Illinois revealed 0.15 suitable cavities/ha (Bellrose et al. 1964). Upland black oak (Quercus velutina) woodlots in central Illinois contained 0.51 suitable cavities/ha (Bellrose et al. 1964). These previous surveys in central Illinois revealed much lower densities of natural cavities suitable for nesting by wood ducks than we found in the present study.

Continued monitoring of nesting in the natural cavities at Sanganois CA in the final year of the project will provide more

information on the importance of cavities to nesting wood ducks in bottomland timber along the Illinois River.

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